CLAIMS

1. A method for the manufacture of bisphenols comprising:

introducing a combined feed stream comprising a feed stream and a recycle stream into a reactor system comprising at least one reactor containing a catalytic proportion of an acid catalyst and wherein the combined feed stream comprises a carbonyl compound and an amount of greater than or equal to about 60 wt% phenol, wherein the weight percents are based on the total weight of the combined feed stream;

removing from the reactor system a reactor effluent;

splitting the reactor effluent into a crystallization feed stream and an effluent recycle stream;

extracting from said crystallization feed stream a bisphenol adduct, remainder comprising a mother liquor stream;

dehydrating said mother liquor stream and said effluent recycle stream in a dehydrator wherein excess water and carbonyl compound are removed; and

recycling the dehydrated mother liquor and the dehydrated effluent recycle stream back to the combined feed stream to effect improved production of p,p-bisphenol, along with increased reactor selectivity and reduced promoter quantities.

2. The method of claim 1, wherein the phenol is an ortho-cresol, meta-cresol, 2,6-dimethylphenol, ortho-sec-butylphenol, 1,3,5 xylenol, tetramethylphenol, 2-methyl-6-tert. butylphenol, orthophenylphenol, ortho- and meta-chlorophenol, ortho-bromophenol, 2,6-dichlorophenol, or a combination comprising at least one of the foregoing phenols.

3. The method of claim 1, wherein the carbonyl compound is acetone, methyl ethyl ketone, methyl propylketone, methyl vinyl acetone, acetophenone and cyclohexanone, or a combination comprising at least one of the foregoing ketones.

4. The method of claim 1, wherein the carbonyl compound is acetone.

5. The method of claim 1, wherein the effluent recycle stream comprises about 6 to about 22 wt% of reactor effluent.

6. The method of claim 1, wherein effluent recycle stream comprises about 8 to about 20 wt% of reactor effluent.

7. The method of claim 1, wherein carbonyl compound concentration in the combined feed stream is about 1 to about 8 wt% of the total weight of the combined feed stream.

8. The method of claim 1, wherein phenol concentration in the combined feed stream is about 60 to about 85 wt% of the total weight of the combined feed stream.

9. The method of claim 1, wherein p,p-bisphenol concentration in the combined feed stream is about 5 to about 20 wt% of the total weight of the combined feed stream.

10. The method of claim 1, wherein the catalyst is a sulfonated polystyrene, poly(styrenedivinylbenzene) copolymers, sulfonated phenolformaldehyde resins, or a combination comprising at least one of the foregoing catalysts.

11. The method of claim 1, wherein the catalyst is an acidic form of sulfonated polystyrene cross-linked with divinylbenzene having an activity of 1.0 and capable of handling a total hydraulic flow of 150 m^3/hour.

12. The method of claim 19 wherein the catalyst comprises pendant sulfonic acid groups having about 2 to about 4% crosslinking of the divinylbenzene.

13. The method of claim 1, wherein the promotor is a methyl mercaptan, ethyl mercaptan, propyl mercaptan, 3-mercaptopropionic acid, or a combination comprising at least one of the foregoing promotors.

14. The method of claim 1, wherein the promotor is 3-mercapto propionic acid and is present in an amount of about 500 to about 10,000 ppm with respect to the total weight of the combined feed stream.

15. A process for the preparation of bisphenols comprising:

reacting acetone with an excess of phenol in a reactor containing a catalyst bed comprising an acidic form of sulfonated polystyrene cross-linked with divinylbenzene having an activity of 1.0, treated with 3-methyl propionic promotor;

splitting the reactor effluent into a crystallization feed stream and an effluent recycle stream, wherein the effluent recycle stream comprises about 6 to about 22 wt% of the reactor effluent;

extracting from the crystallization feed stream a bisphenol adduct to leave behind a mother liquor;

dehydrating the mother liquor and the effluent recycle stream to produce a recycle stream;

combining the recycle stream with a new feed stream to produce a combined feed stream wherein the combination of the recycle stream and feed stream results in an improved production of p,p-bisphenol or reduced levels of promotor.

16. A method of claim 15, wherein the reactor inlet temperature is about 45°C to about 60°C.

17. A method of claim 15, wherein the p,p-bisphenol concentration in the combined feed stream is about 5 to about 20 wt% of the total weight of the combined feed.

18. A method of claim 15, wherein the acetone concentration in the combined feed stream is about 1 to about 8 wt% of the total weight of the combined feed.

19. A method for manufacturing a polycarbonate comprising:

reacting p,p-bisphenol with a carbonate precursor, wherein the p,p-bisphenol is manufactured by a process comprising:

introducing a combined feed stream comprising a feed stream and a recycle stream into a reactor system comprising at least one reactor containing a catalytic proportion of an acid catalyst and wherein the combined feed stream comprises a carbonyl compound and a stoichiometric excess of phenol;

removing from the reactor system a reactor effluent;

splitting the reactor effluent into a crystallization feed stream and an effluent recycle stream;

extracting from said crystallization feed stream a bisphenol adduct, remainder comprising a mother liquor stream;

dehydrating said mother liquor stream and said effluent recycle stream in a dehydrator wherein excess water and carbonyl compound are removed; and

recycling the dehydrated mother liquor and the dehydrated effluent recycle stream back to the combined feed stream to effect the production of p,p-bisphenol.

20. The method of Claim 19, wherein the p,p-bisphenol is interfacially reacted with the carbonate precursor.

21. The method of Claim 20, wherein the carbonate precursor is a carbonyl halide.

22. The method of Claim 21, wherein the carbonyl halide is phosgene.

23. The method for Claim 19, wherein the polycarbonate has a number average molecular weight of about 3,000 to about 1,000,000 grams/mole.

24. A method for manufacturing a polycarbonate comprising:

reacting p,p-bisphenol with a carbonic acid diester, wherein the p,p-bisphenol is manufactured by a process comprising:

introducing a combined feed stream comprising a feed stream and a recycle stream into a reactor system comprising at least one reactor containing a catalytic proportion of an acid catalyst and wherein the combined feed stream comprises a carbonyl compound and a stoichiometric excess of phenol;

removing from the reactor system a reactor effluent;

splitting the reactor effluent into a crystallization feed stream and an effluent recycle stream;

extracting from said crystallization feed stream a bisphenol adduct, remainder comprising a mother liquor stream;

dehydrating said mother liquor stream and said effluent recycle stream in a dehydrator wherein excess water and carbonyl compound are removed; and

recycling the dehydrated mother liquor and the dehydrated effluent recycle stream back to the combined feed stream to effect the production of p,p-bisphenol.

25. The method of Claim 24, wherein reacting the p,p-bisphenol with the carbonic acid diester is conducted in a melt.

26. The method of Claim 23, wherein the carbonic acid diester is diphenyl carbonate.

27. The method for Claim 23, wherein the polycarbonate has a number average molecular weight of about 3,000 to about 1,000,000 grams/mole.